that Dr. Gould, when corresponding with me some years ago on the matter, informed me that the phenomenon was frequently an anxiety to the Cordoba observers. It is not unreasonable, therefore, to conclude that the error, in at least its general characteristics, influences all eye-estimates of star magnitudes by the method sequences. That there are possibilities, therefore, of grave misleading in discussing observations, in the securing of which no steps have been taken, either through want of care or want of knowledge, to eliminate so important an error, is surely beyond reasonable doubt. Indeed, it is certain that every result based on uncorrected observations is more or less in error.

Whether some of the secondary terms that appear so often in the computed elements of variable stars have their origin in this source of error I cannot say; only it is possible for position error to give rise to such secondary terms when left uncorrected. It is unnecessary to dwell upon the connection existing between this tendency and the exceedingly long lists of suspected variables which now and again find a lodging place in astronomical literature.

The assumption all through this paper, as well as in the papers of Safarik, Pickering, Chandler, and Barnard, is that the error has its source in the eye of the observer. I have convinced myself that this is so by a very simple expedient. The telescope I use is a small 1-inch theodolite. To make sure that the error was not due to the nature or adjustments of the instrument, I rotated the small telescope in its Ys, thus taking the observations with the object glass in all positions. I also used a variety of eye-pieces. Further, when the head was rotated through a certain angle, the same changes in the relative magnitudes of the stars seemed to take place as would have been observed had the stars moved through an equal hour angle.

The error also operates in cases when no optical aid is required.

Proper Motion of the Southern Short Period Variables L Carinæ and K Pavonis. By Alexander W. Roberts.

The following proper motions of *L Carinæ* and *K Pavonis* have been determined solely from observations made at the Cape Observatory. The measures available are the positions given in the General Catalogues for 1840, 1850, 1860, 1880, and the meridian results of 1887, 1888, 1889, 1890, 1891.

The mean places are reduced to 1900·0, using Newcomb's precession constants (*Astron. Constants,* p. 196), and the mean latitude of the Cape Observatory is held to be

$$-33^\circ\ 56'\ 3''\!.52.$$

Whenever possible Chandler's corrections for latitude variation have been applied, and the various catalogues have been differentially compared.

L Carinæ.

No.	Epoch.	Taken from.	R.A.	Red.	R.A. (1900).	Dec.	Red.	Dec. (1900).	No. of Obs.	Weight
			h m s	m s		° ′ ″	′ ″			
1	1840	Cat. 1840	9 40 51·16	+1 38·99	9 42 30·15	−61 46 18·11	−16 30·60	−62 2 48·71	6–9	2
2	1850	Cat. 1850	41 7·74	1 22·48	30·22	49 2·49	13 46·05	48·54	1–3	1
3	1860	Cat. 1860	41 23·96	1 5·98	29·94	51 46·82	11 0·90	47·72	4–4	1
4	1880	Cat. 1880	41 57·07	32·99	30·06	57 17·46	5 30·65	48·11	3–3	1
5	1890	Mer. Result, 1887–91	42 13·34	16·49	29·83	60 2·42	2 45·85	48·27	12–12	3

A discussion of the above reduced places yields the following :—

R.A. (1900) $9^h\ 42^m\ 29^s{\cdot}795$. P.M. = $-0^s{\cdot}006$. Dec. $-62°\ 2'\ 48''{\cdot}09$. P.M. = $+0''{\cdot}007$.

K Pavonis.

No.	Epoch.	Taken from.	R.A.	Red.	R.A. (1900).	Dec.	Red.	Dec. (1900).	No. of Obs.	Weight.
			h m s	m s		° ′ ″	′ ″			
1	1840	Cat. 1840	18 40 25·12	+6 13·34	18 46 38·46	...	...	...	5–0	2
2	1850	Cat. 1850	41 27·59	5 11·02	38·61	−67 24 42·58	+3 11·07	−67 21 31·51	2–2	1
3	1860	Cat. 1860	42 29·59	4 8·73	38·32	24 7·03	2 35·19	31·84	3–3	1
4	1880	Cat. 1880	44 34·09	2 4·27	38·36	22 50·75	1 18·73	32·02	3–3	1
5	1890	Mer. Result, 1887–91	45 36·22	1 2·11	38·33	22 11·99	39·88	32·11	10–10	3

A discussion of the above places yields the following :—

R.A. (1900) $18^h\ 46^m\ 38^s{\cdot}303$. P.M. $-0^s{\cdot}003$. Dec. $-67°\ 21'\ 32''{\cdot}26$. P.M. $-0''{\cdot}013$.

An Improvement in Winding Equatorial Clocks.

By A. F. Lindemann.

All equatorial clocks are, as far as I am aware, disturbed during winding; but the disturbance is usually hidden by the momentum of the heavy governor. My intention being to detect and correct all driving errors, I constructed an exceedingly light governor, weighing about $\frac{1}{4}$ oz., and rotating 540 times a minute, the clock being corrected every second by a main pendulum clock. With this arrangement the winding error was most conspicuous, until the new winding was introduced, with the result that a star set to the vertical line of the micrometer and observed with a power of 214 showed absolutely no movement during the most irregular starting, winding, or stopping. The construction of new winding is as follows (Plates 14 and 15, figs. 1, 2 and 3):

I took barrel out of clock (an old one by Cook) and inserted in its place a double V-grooved cast iron sheave (1 and 2) and fixed it to the axle C by a steel screw and by a pin resting against one spoke of the main driving wheel D. Exactly under the axle C I placed the winding axle E, held in position on one side by a screw and washer, on the other by a ratchet-wheel R and ratchet r and a double V-grooved cast-iron sheave 1_1 and 2_1, of the same dimensions as 1 and 2, and carrying on the prolongation of E the winding crank d. Ratchet-wheel and sheave are soldered to E. Fixed to the iron clock support G is the fork H, which carries at the outer end the axle I, upon which the ⌣-grooved loose sheaves a b and a_1 b_1 are placed, secured on both ends by washers and screw heads. Under this fork and just in front of clock support G are fixed by means of a plate and axle the ⌣-grooved guiding rollers c and c_1. An endless clock string, with long splice of 3 feet and about $\frac{3}{16}$-inch thick, carries the weight P and counter weight p as seen in fig. 3, and starting say at β, passing on c and the front of 1 returns to top of a, crossing over to 2, whence it returns over top of b down to sheave r^1, carrying counter weight p, rises on the other side to sheave b_1, passing on and under 2_1, from there crossing over to and under a_1 and over to and under 1_1, from which it passes on to c_1, descending to sheave R (to which is attached the large driving-weight P), and returns from there to β. The action is obvious, the weight P is always with $\frac{P}{2}-\frac{p}{2}$ on driving wheel D. During winding the same is the case, and consequently there is no change in the clock's rate. When winding, all that happens is that the string with P is pulled up by sheave 1_1 and 2_1, the weight p descending the same amount. The ratchet prevents the turning back of axle E with its sheaves, and the whole winding is done by friction. I rejected the chain, which would have been simpler,